

**(19) GB (11) 2 279 002 (13) A**

**(43) Date of A Publication 21.12.1994**

**(21) Application No 9323610.7**

**(22) Date of Filing - 16.11.1993**

(31) 05146044

**(32) 17.06.1993**

(33) JP

**05146045**

**17.06.1993**

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(51) INT CL<sup>5</sup>

**A47B 21/00**

(52) UK CL (Edition M)

**A4L LACD L115**

**(56) Documents Cited**

**EP 0102582 A**

**(58) Field of Search**

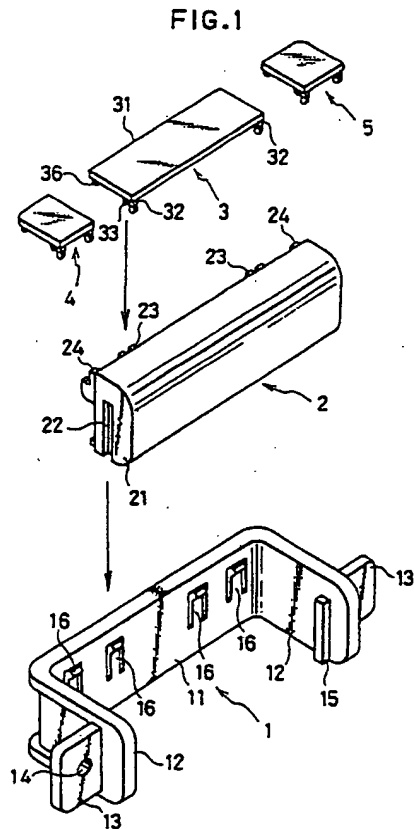
UK CL (Edition M ) A4L LAAJ LACD LSHC

**INT CL<sup>5</sup> A47B 21/00**

## ONLINE DATABASES:EDOC

**(54) Cable duct for office desk**

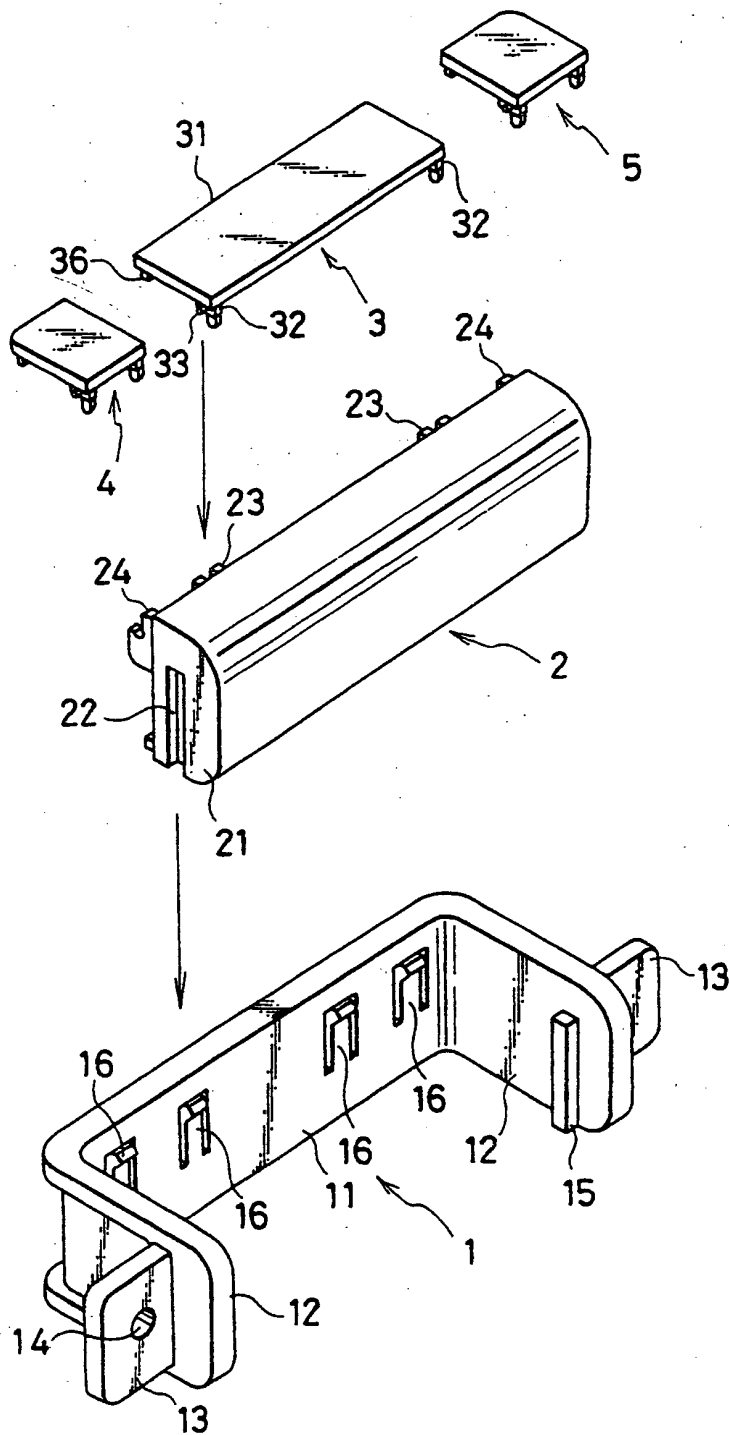
(57) A cable duct for an office desk comprises a channel formed by slotting a side piece 2 into a co-operating back-plate 1. The side plate carries lugs 23 into which are engaged projections 32 on the cap piece 3 to form an inwards opening hinge. The cap may then provide a flush fitting closure, or may be pivoted inwardly to access the cable.



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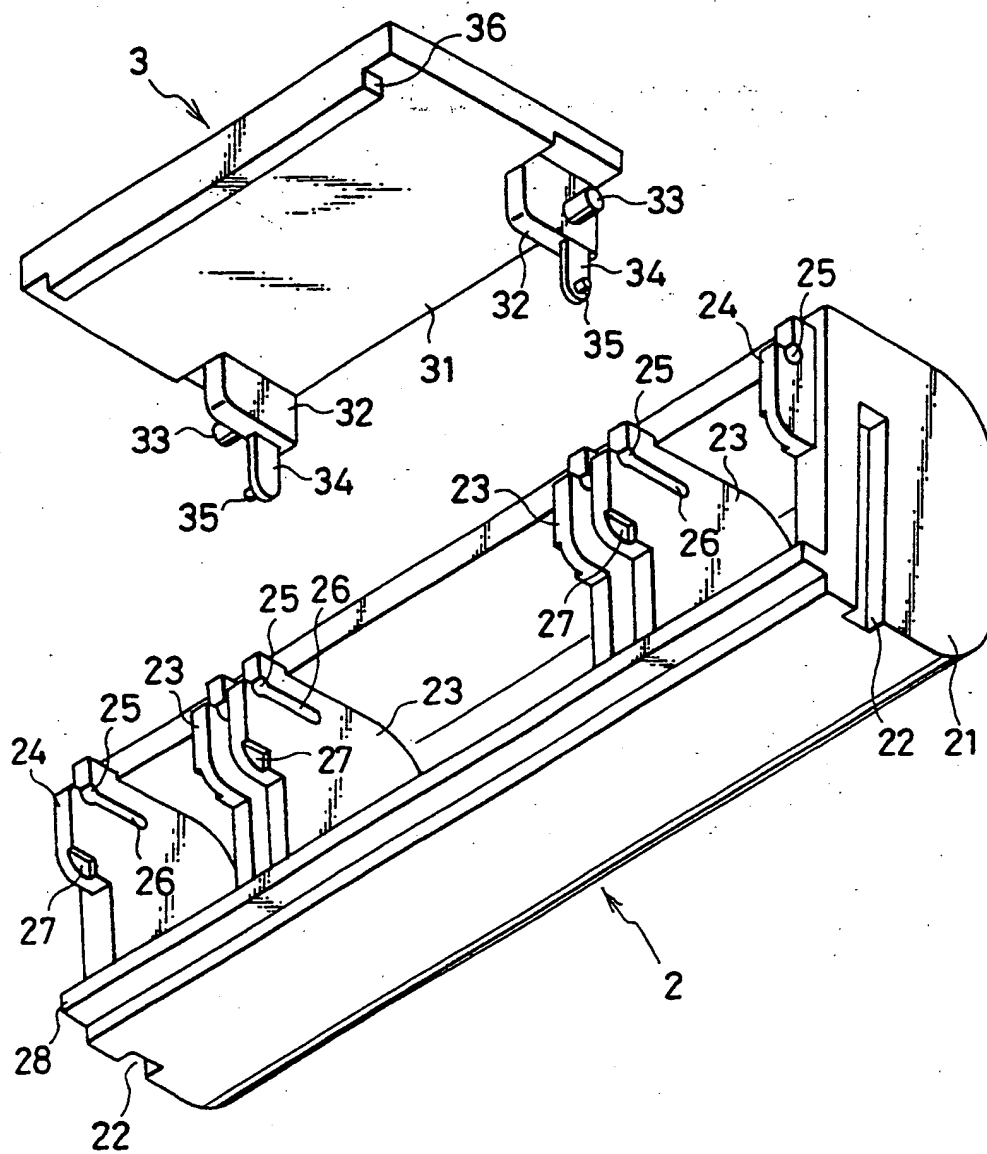
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FIG. 1



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FIG. 2



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FIG. 3

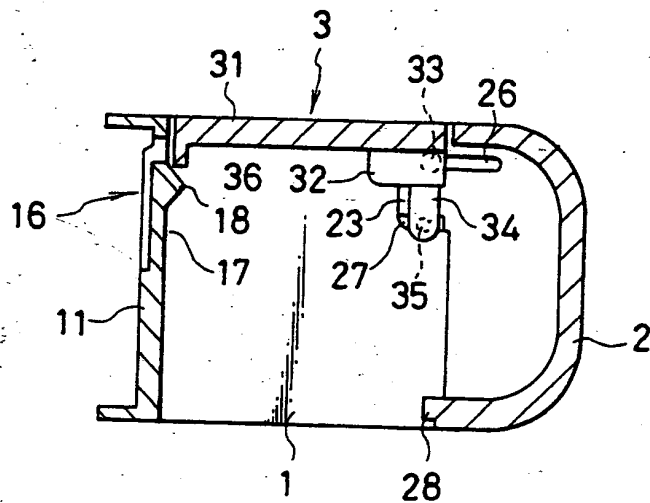


FIG. 4

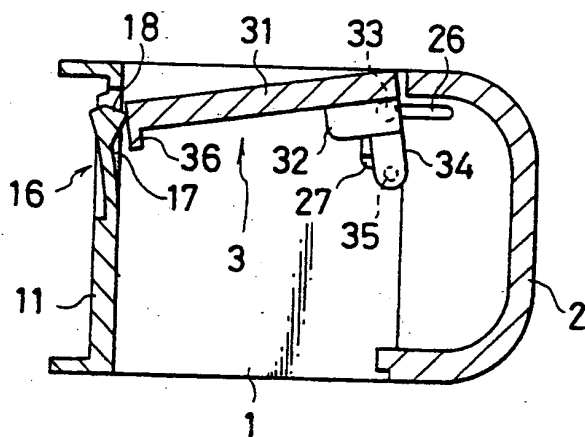


FIG. 5

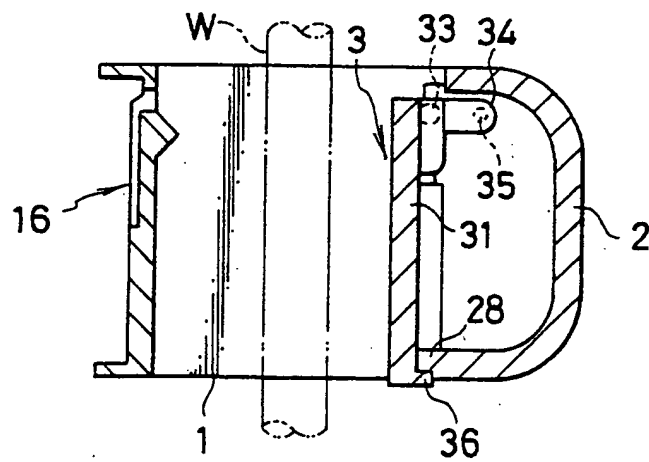
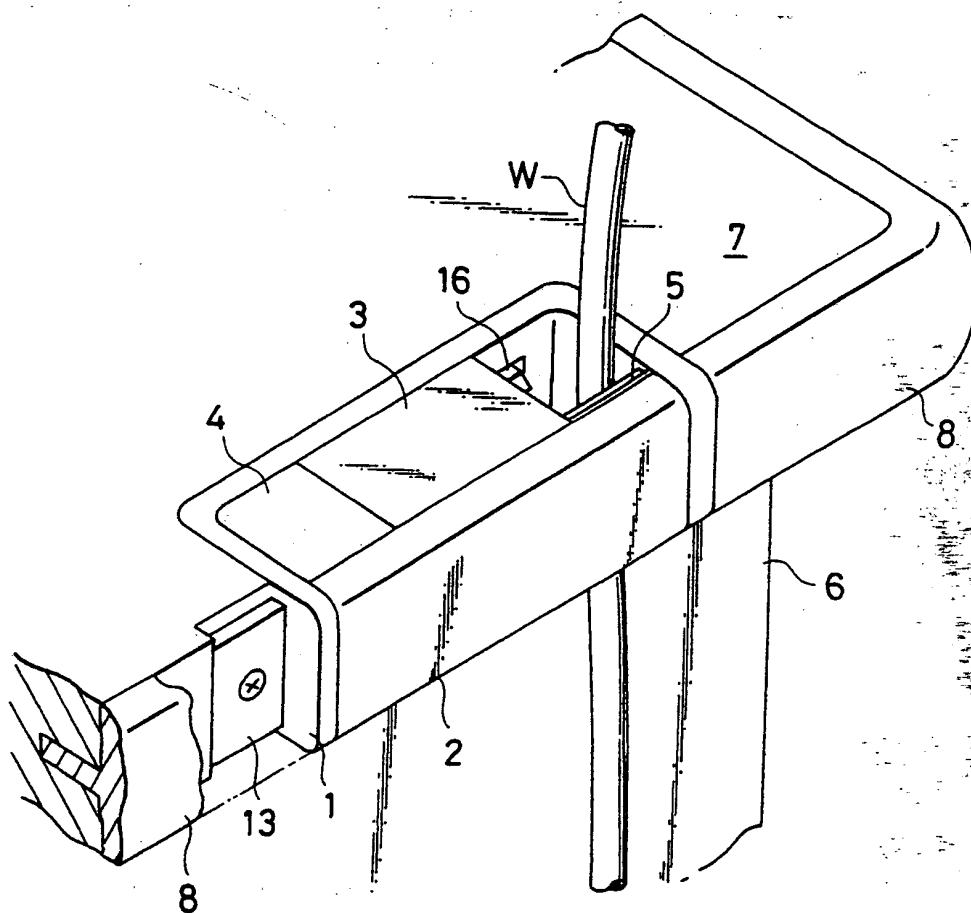


FIG. 7



## CORD HOLE OPENING/CLOSING DEVICE FOR DESK OR THE LIKE

The present invention relates to a cord hole opening/closing device for selectively opening or closing one or more cover plates for a desk or the like.

In recent years, various types of office automation equipment, such as word processors, personal computers or the like, are increasingly being installed in offices as their performance improves rapidly year by year. Items of office automation equipment as mentioned above are usually mounted on desks in the office, in addition to a telephone.

To supply the office automation equipment with electricity and to transmit a variety of signals to them, a plurality of cords such as power supply cord, signal transmission cord or the like are normally arranged to reach the desk normally through the rear panel or the top panel of the desk. As the amount of office automation equipment increases, the number of cords correspondingly increases.

In the event that a number of cords are caused to extend along the floor surface of the office and/or along the side panels of the desk, malfunctions often arise when an employee's foot collides with the cords, causing the office automation equipment to be adversely affected by the shock caused by the collision. Another malfunction is that random extension of the cords degrades the aesthetic appearance of the office interior.

Recently, so-called system desks are increasingly being installed in offices, and a single cord hole is formed through the top panel of each system desk so as to enable various kinds of cords to extend through the cord hole to reach the respective office automation equipment. To prevent these cords from being damaged or scratched by the sharp corner edges of the cord

hole, a cord protective frame, molded from an elastic material such as an elastic synthetic resin or the like, is fitted into the cap hole formed through the top panel of the desk.

5        In addition, to reliably prevent cords inserted through a cord hole from being damaged or scratched by the sharp corner edges of the cord hole, a cord hole capping device, having a technical concept similar to that of the present invention, to include an  
10        opening/closing cap or a removable cap, is hitherto known and has been put into practical use to some extent.

      In the case when just a single cord hole is formed through the top panel of a desk, the problem arises  
15        that the office desks become short on the number of cord holes when additional office automation equipment is installed in the office. To resolve this problem of a shortage in the number of cord holes, it is conceivable that several cord holes are formed in the  
20        top panel of the desk, in such a manner that one or more of these cord holes is closed with a removable cap fitted into it, when just a small number of cords are inserted through the hole. In this case, however, the cap that has been removed or disconnected from the cord  
25        hole is often unexpectedly lost for some reason when it is stored in the office for a long time.

      It is also conceivable that a non-removable cover plate is fitted to each cord hole in such a manner that it is opened by being raised up when cords are inserted  
30        through the cord hole, but is kept closed when there is no need to insert cords through it. In this case, however, the raised cover plate standing upright on the desk degrades the aesthetic appearance of the desk.

      The present invention has been made considering the  
35        aforementioned background.

      The object of the present invention is to provide a cord hole opening/closing device for a desk or the like



wherein the device is attached to the top panel of a desk.

Another object of the present invention is to provide a cord hole opening/closing device of the  
5   aforementioned type which allows that one or more of the cord holes to be selectively opened, depending on the number of cords to be inserted through the hole, or on the size of each cord.

The present invention provides a cord hole  
10   opening/closing device for selectively opening or closing one or more cover plates for a desk or the like, wherein the device includes as essential components as a casing having a basically U-shaped form as seen from above, coincident with that of a cutout  
15   portion formed in the top panel of the desk, a cap fitted into the hollow space defined between the opposite ends of the casing, connecting them to each other, the cap including a plurality of bearing plates extending inwards from the inner surface of the cap, a  
20   plurality of pivotted cover plates, each supported by the bearing plates of the cap to assume the closed position where the upper surface of the cap is flush with the upper surface of the desk, or the open position where one or more of the cover plates are  
25   rotated in the downward direction to form one or more cord holes in cooperation with the casing so as to enable cord(s), cord(s) or the like to be inserted therethrough, and engaging means for holding the cover plates either at the closed position or at the opened  
30   position.

In the case of the means of engagement for holding the coverplates at the closed position, a plurality of engagement hooks are formed on a rear plate of the casing and each of these engagement hooks has a  
35   protuberance adapted to come into engagement with the foremost end of each cover plate. When one or more of the cover plates are selected for rotation and squeezed

in the downward direction to assume the open position, the protuberances are released from being in the engaged state by the action of elastic deformation of the engagement hooks.

5 On the other hand, in the case of the means of engagement for holding the cover plates at the opened positions, the means of engagement are composed of a plurality of first engagement grooves extending from the bearing holes formed through bearing plates of the  
10 cap at the foremost ends of the latter, a plurality of second engagement grooves formed below the first engagement grooves at the lower end parts of the bearing plates, and a plurality of engagement pins disposed to the foremost ends of the abutment arms,  
15 each extending downwards from support plates projecting from the lower surface of the cap on the rear side of the latter.

The engagement pins are fitted into the first engagement grooves when the cover plate is rotated to  
20 assume the opened position.

In addition, the engagement pin are fitted into the second engagement grooves when the cover plate is held at the closed position.

Usually, a cover plate unit is divided into three  
25 coverplates in the transverse direction of the desk or the like, and central cover plate has an extended width and each of other cover plates has a width smaller than that of the central cover plate.

To assure that the cover plates are reliably held  
30 at the opened positions, each cover plate includes an engagement bar at the front end thereof which extends across the width of the cover plate. When each cover plate is held at the closed position without forming any cord hole, the engagement bar comes in contact with  
35 the protuberance from above, and subsequently, when the cover plate is held at the opened position to form a rectangular cord hole in cooperation with the casing so

as to enable cord(s) or the like to be inserted through, the engagement bar is engaged with the lower surface of an abutment member integrated with the cap at the lower end of the latter while extending across  
5 the width of the same.

Other objects, features and advantages of the present invention will become apparent from reading the following descriptions which have been made in conjunction with the accompanying drawings.

10 Fig. 1 is a perspective view of a cord hole opening/closing device for selectively opening or closing one or more cover plates in a desk or the like constructed according to an embodiment of the present invention, particularly showing essential components  
15 constituting the device in the disassembled state.

Fig. 2 is a perspective view of a cap and a central cover plate constituting the device as seen obliquely from below.

Fig. 3 is a vertical sectional view of the device, particularly showing the state when the central cover  
20 plate assumes a closed position.

Fig. 4 is a vertical sectional view of the device, particularly showing the state when the central cover plate is partially rotated by being squeezed in the  
25 downward direction.

Fig. 5 is a vertical sectional view of the device, particularly showing the state when the central cover plate is fully rotated in the downward direction to assume an intermediate position.

30 Fig. 6 is a vertical sectional view of the device, particularly showing the state when the central cover plate is fully rotated in the downward direction to assume an opened position.

Fig. 7 is a perspective view of a desk having the  
35 device attached thereto, particularly showing that the device is attached to the top panel of the desk.

The present invention will now be described in

detail hereinafter with reference to the accompanying drawings which illustrates the preferred embodiment thereof.

5 A cord hole opening/closing device for selectively opening or closing one or more cover plates for a desk or the like (hereinafter referred to simply as a device) includes a casing 1, a cap 2 and three cover plates 3, 4 and 5 as essential components.

10 As shown in Fig. 1, the casing 1 is designed in the basically U-shaped form as viewed from above and includes a back plate 11 and a pair of side plates 12 extending from the opposite ends of the back plate 11 at right angles relative to the back plate 11. The contour of the casing 1 is determined to exactly  
15 coincide with the contour of a cutout portion formed through the top panel 7 of the desk at a predetermined position in the latter. Similarly, the contours of each of the outer ends of the opposite side plates 12 are determined to exactly coincide with the contours of  
20 an edge member 8 secured to a rear edge of the desk. In the illustrated embodiment, the contour of the outer end of each side plate 12 is designed to exhibit an rounded shape, i.e., an arced shape.

A bracket 13 having a bolt hole 14 formed  
25 therethrough is projected outwards from each side plate 12 at right angles relative to the side plate 12 at the position in the vicinity of the outermost end of the same, in such a manner as to enable it to be fastened to the rear end of the top panel 7.

30 In addition, a guide 15 adapted to hold the cap 2 by a sliding fit is projected inwards from each side plate 12 at the position located approximately opposite to the bracket 13 in the vicinity of the outermost end of the side plates 12 while extending in the vertical  
35 direction.

In the illustrated case, four engagement hooks 16 are formed on the front surface of the back plate 11 in

the spaced relationship as seen in the transverse direction. Among the four engagement hooks 16, the two inside engagement hooks 16 are arranged at the positions located opposite to the boundary lines  
5 between the central cover plate 3 and the outside cover plates 4 and 5, while the two outside engagement hooks 16 are arranged at the positions located in the vicinity of the outer edge ends of the outside cover plates 4 and 5.

10 As shown in Fig. 3, each of the engagement hooks 16 is constructed in such a manner that a tongue-shaped piece 17 is formed by cutting an inverted U-shaped cutout portion at the predetermined position in the back plate 11 and a protuberance 18 having a triangular  
15 sectional shape is projected from the tongue piece 17.

Each tongue piece 17 is dimensioned to have a thickness appreciably smaller than that of the back plate 11 so as to permit the tongue piece 17 to be elastically deformed in the horizontal direction.

20 The cap 2 is molded of a synthetic resin in the hollow box-shaped form in which the rear surface is kept open, and vertically extending grooves 22 adapted to be engaged by sliding with the guides 15 on the casing 1 are recessed on the opposite side plates 21 so  
25 that the cap 2 is fitted to the casing 1 by inserting the cap 2 from above into the space defined between the opposite side plates 12 of the casing 1.

The outer surface of the cap 2 at the rear end of the cap is designed to have an arced sectional shape  
30 coincident with that of the outermost end part of each side plate 12 of the casing 1.

In the illustrated embodiment, three pairs of bearing plates 23 and 24 are molded onto the rear surface side of the cap 2 to pivot the three cover  
35 plates 3 to 5.

As shown in Fig. 1, each of the cover plates 3 to 5 is formed to have a width derived from a value obtained

by dividing the inside dimension between the opposite side plates 12 of the casing 1 into three parts. In the illustrated embodiment, the central cover plate 3 has an extended width and the left-hand and right-hand cover plates 4 and 5 have a width smaller than that of the central cover plate 3.

The dimension of each of the cover plates 3 to 5, as measured in the forward direction of the desk, is determined to assume a value appreciably smaller than the dimension between the foremost ends of the side plates 12 and the front surface of the back plate 11 of the casing 1, in consideration of the gap appearing between the rear plate 11 of the casing 1 and the rear edge of the cap 2, when the cap 2 is fitted to the casing 1 from above.

A pair of support plates 32, adapted to be engaged with the bearing plates 23 of the cap 2, are projected downward from the lower surface of each of the cover plates 3 to 5, and moreover, an engagement bar 36 is integrally fitted to the lower surface of each of the cover plates 3 to 5 while extending along the rear edge of the same. The support plates 32 and the engagement bar 36 will be described in more detail later.

Fig. 2 shows by way of an enlarged perspective view the structure of the cap 2 and the central cover plate 3 as seen obliquely from below. Since the left-hand cover plate 4 and the right-hand cover plate 5 are dimensionally coincident with the central cover plate 3 with the exception that they have a width different from that of the central cover plate 3, the illustration of both the cover plates 4 and 5 is neglected in this figure for the purpose of simplification thereof.

Three pairs of bearing plates 23 and 24 are projected downward from the lower surface of the cap 2 corresponding to the cover plates 3 to 5. Among the bearing plates 23 and 24, the inner four bearing plates

23 are formed to serve as partition plates each defining a part of the interior of the cap 2, and the outermost two bearing plates 24 are formed integral with the opposite side plates 22 of the cap 2.

5 The uppermost end parts of the rear edges of the respective bearing plates 23 and 24 are projected outside of the rear surface of the cap 2, and bearing holes 25 are formed through the respective bearing plates 23 and 24. A rear upper part of each bearing  
10 hole 25 is cut out so as to enable a support shaft 33 on each support plate 32 extending downward from the cover plate 3, to be inserted into the bearing hole 25 obliquely from above.

Engagement grooves 26, each horizontally extending  
15 forward from the bearing hole 25, are formed on the surfaces of the bearing plates 23 located opposite to each other, and moreover, another engagement groove 27 is formed at a projected part of each bearing plate 23 around the lower rounded edge of the same.

20 In addition, an abutment member 28 is projected rearward from the lower end part of the cap 2, while extending across the whole width of the cap 2.

Referring to Fig. 2 again, an opposing pair of support plates 32 are projected downward from the lower  
25 surface of a main body 31 of the cover plate 3, at the positions located in the vicinity of the opposite ends of the main body 31, and moreover, a support shaft 33 is projected outward from each support plate 32.

An abutment arm 34 is projected downward from the  
30 lower surface of each support plate 32, and an engagement pin 35 is projected outward from the abutment arm 34. Each abutment arm 34 is molded of an elastic synthetic resin so as to enable it to be deformed in the horizontal direction.

35 While a pair of support shafts 33 are fitted into the corresponding bearing holes 25, formed through the bearing plates 24, the cover plate 3 can be pivotted to

rotate to assume either a horizontal closed position or a vertical opened position.

At this time, the positions of the support shafts 33 and the engagement groove 26 and 27 are relatively determined in such a manner that when the central cover plate 3 is held at the closed position (see Fig. 3), the engagement pins 35 are fitted into the engagement grooves 27 on the bearing plate 23, and when the central cover plate 3 is held at the fully opened positions (see Fig. 6), the engagement pins 35 are fitted into the engagement grooves 26 on the bearing plates 23.

An engagement bar 36 is integrally projected downward from the lower surface of the main body 31 of the central cover plate 3. The position of the engagement bar 36 is determined in such a manner that when the central cover plate 3 is held at the opened position, the engagement bar 36 is brought into engagement with the lower surface of the abutment member 28 of the cap 2 (see Fig. 6).

As mentioned above, the left-hand cover plate 4 and the right-hand cover plate 5 are designed to exhibit the same form as that of the central cover plate 3 with the exception that the width of each of the cover plates 4 and 5 is different from that of the central cover plate 3.

Next, the mode of function of the device constructed in the aforementioned manner will be described below with reference to Fig. 3 to Fig. 6. Each of these drawings is a sectional view of the device which shows the operative state of the device when the casing 1, the cap 2 and the central cover plate 3 are assembled together.

Referring to Fig. 3, while the cover plate 3 is held in the horizontal closed state, the support shafts 33 on the support plate 23 are fitted into the bearing holes 25 on the bearing plates 23, and the engagement



bar 36 extending along the rear edge of the main body 31 of the central cover plate 3 comes in contact with the upper surface of the protuberance 18 of each engagement hook 16, so as to allow the cover plate 3 to be supported in the horizontal attitude.

When the central cover plate 3 is held at the closed position, the engagement pins 35 on the abutment arms 34 are fitted into the engagement grooves 27 recessed at the lower end parts of the bearing plates 23.

When a cord is to be inserted through a rectangular cord hole of the device which appears after the central cover plate 3 is opened, the central cover plate 3 is rotated by being squeezed in the downward direction so as to pivot about the support shafts 33.

Fig. 4 shows by way of sectional view the state when the central cover plate 3 is slightly rotated by being squeezed in the downward direction. At this time, the protuberance 18 of each engagement hook 16 is pushed by the rear edge of the main body 31 of the central cover plate 3, causing the tongue piece 17 to be elastically deformed in the rearward direction so as to release the engagement bar 36 extending, downward from the main body 31 of the central cover plate 3, from the engaged state. On the other hand, the abutment arms 34 are elastically deformed in the inward direction so that the engagement pins 35 are disengaged from the engagement grooves 27.

Fig. 5 shows by way of sectional view the state when the cover plate 3 is rotated by being squeezed further in the downward direction. At this time, the engagement hooks 16 are released from the state being pushed to elastically resume their original position, and while each abutment arm 34 is elastically deformed in the inward direction, it is displaced along an arced locus while being in sliding contact with the side surface of the bearing plate 23.

Similarly, Fig. 6 shows by way of sectional view the state when the cover plate 3 is fully rotated to assume a vertical opened position. At this time, the engagement bar 36 extending along the rear edge of the main body 31 of the cover plate 3 is engaged with the abutment member 28 of the cap 2. On the other hand, the engagement pins 35 of the abutment arms 34 are inserted into the engagement grooves 26, causing the engagement pin 35 to be fitted into the engagement grooves 26 by the action of elasticity of the abutment arms 34. Thus, the cover plate 3 is firmly held in the opened position.

While the central cover plate 3 is kept opened in that way, a rectangular cord hole is formed between the rear plate 11 of the casing 1 and the cap 2. Consequently, a cord W can be inserted into the interior of the desk through the rectangular cord hole so formed.

When there arises the necessity for disconnecting the cord W from the desk, the cord W is drawn out of the interior of the desk, and thereafter, the cover plate 3 is rotated from the opened position in the upward direction to resume the horizontal closed position (i.e., the position shown in Fig. 3), whereby the rectangular cord hole is closed with the cover plate 3.

Fig. 7 is a perspective view of the device constructed in the above-described manner, in particular showing how the device is used practically while being attached to a part of the top panel 7 of the desk.

In the illustrated case, the casing 1 is first fitted into a cutout portion formed on the top panel 7 of the desk 6 at a predetermined position located on the top panel 7, and it is then fastened to the top panel 7 by tightening two bolts inserted through the holes 14 of the brackets 13.

It is desirable that after the brackets 13 are fastened to the top panel 7, an edge member 8 is secured the top panel 7 so as to allow the brackets 13 to be covered with the edge member 8.

5 As is apparent from the above description, the desired number of cord holes can be formed depending on the size of each cord to be inserted through and as well as the numbers of cords by selectively opening or closing one or more of the cover plates among the three  
10 cover plates 3 to 5. Fig. 7 shows the case when a single right-hand cover plate 5 is opened so as to enable a cord W to be inserted through the rectangular cord hole formed by opening the right-hand cover plate 5, in the same manner as mentioned above with reference  
15 to Fig. 3 to Fig. 6.

In this case, the remaining two cover plates 3 and 4 are held in the horizontal closed state so that the upper surface of the cover plates 3 and 4 are flush with the upper surface of the top panel 7.

20 With the device constructed in the above-described manner, a desired number of cord holes defining the required cord inserting area can be formed depending on the size of each cord to be inserted through the cord holes, and the number of cords by rotating open one or  
25 more of a plurality of cover plates, while the remaining area of the device is kept closed with the remaining cover plates which are held still in the closed state.

While the present invention has been described  
30 above with respect to an embodiment wherein the device is attached to the top panel of the desk, it should of course be understood that the present invention should not be limited to only this embodiment. Alternatively, the present invention may equally be applied to a  
35 system rack or the like on which personal computers or the like are installed.

In addition, the number of cover plates to be used

for the device, and a size of each cover plate may arbitrarily be selected depending on the number of cords and the size of each cord to be inserted through each cord hole.

5        Finally, the advantages obtainable from the device of the present invention will be as noted below.

      (a) With the device constructed in the above-described manner, since only the desired number of cover plates are opened depending on the number of  
10    cords to be inserted through each cord hole and the size of each cord, and the remaining cover plates are kept closed, while they are basically flush with the upper surface of the top panel of the desk or the like, the malfunction does not arise when unused similar cord  
15    holes are accidentally opened, causing the whole device to assume an unacceptable appearance.

      (b) Since each of the cover plates can reliably be held not only at the closed position but also at the opened position, the malfunction does not arise when  
20    the cover plates are undesirably rotated thereby obstructing the working function of the desk.

      (c) Since each cord hole can arbitrarily be designed based on dimensions of each cover plate, cords can easily be inserted through the cord hole.

25    (d) Since only the required number of cover plates are opened to form cord holes where the bottom of the device is kept open, a minimum quantity of any foreign material such as dust or the like enters the interior of the desk, through the opened cord holes only. Thus,  
30    the malfunction does not arise that the inserted cords are damaged by the foreign material deposited on the bottom of the device.

## CLAIMS

1. A cord hole opening/closing device for selectively opening or closing one or more cover plates for a desk or the like, characterized in the said device includes as essential components a casing having a substantially U-shaped form as seen from above, coincident with that of a cutout portion formed in the top panel of said desk, a cap fitted into the hollow space defined between the opposite ends of said casing to connect them to each other therewith, said cap including a plurality of bearing plates extending inwards from the inner surface of said cap, a plurality of cover plates each pivotted by said bearing plates of said cap to assume the closed position where the upper surface of said cap is flush with the upper surface of said casing or the open position where one or more of said cover plates are pivotted in the downward direction to form one or more rectangular cord holes in cooperation with said casing so as to enable cord(s) or the like to be inserted therethrough, and engaging means for holding said cover plates either at the closed positions or at the opened positions.

2. A cord hole opening/closing device as claimed in claim 1, characterized in that the engaging means for holding said cover plates at the closed positions are prepared in the form of a plurality of engaging hooks, each formed on a rear plate of said casing and including a protuberance adapted to come into engagement with the foremost end of each cover plate, said protuberance being released from the engaged state by the action of elastic deformation of said engaging hooks, when each of said cover plates is rotated by being squeezed in the downward direction to assume the open position.

3. A cord hole opening/closing device as claimed in claim 1, characterized in that the engaging means for holding said cover plates at the opened positions are composed of a plurality of first engagement grooves extending from bearing holes formed through bearing plates of said cap at the foremost ends of the latter, a plurality of second engagement grooves formed below said first engagement grooves at the lower end parts of said bearing plates, and a plurality of engagement pins disposed at the foremost ends of abutment arms extending downward from supports plate projected downward of the lower surface of said cap on the rear side of the latter.

4. A cord hole opening/closing device as claimed in claim 3, characterized in that said engaging pins are fitted into said first engagement grooves when said cover plate is held at the closed state.

5. A cord hole opening/closing device as claimed in claim 3, characterized in that said engagement pins are fitted into said second engagement grooves when said cover plate is rotated to assume the opened position.

6. A cord hole opening/closing device as claimed in claim 1, characterized in that a cover plate unit is divided into plural cover plates each having a different width as measured in the transverse direction of said desk.

7. A cord hole opening/closing device as claimed in claim 6, characterized in that said cover plate unit is divided into three cover plates in the transverse direction of said desk or the like.

8. A cord hole opening/closing device as claimed in claim 7, characterized a central cover plate has an

extended width and each of other plate segments has a width smaller than that of said central cover plate.

9. A cord hole opening/closing device as claimed in claim 6, characterized in that each cover plate unit includes an engagement bar at the front end thereof while extending across the width of said cover plate segment.

10. A cord hole opening/closing device as claimed in claim 9, characterized in that said engagement bar comes in contact with said protuberance from above when said cover plate unit is held at the closed position without any cord hole being formed.

11. A cord hole opening/closing device as claimed in claim 9, characterized in that said engagement bar is engaged with the lower surface of an abutment member integrated with said cap at the lower end of the latter while extending across the width of the same when said cover plate unit is held at the opened position to form a rectangular cord hole in cooperation with said casing so as to enable cord(s) or the like to be inserted therethrough.

12. A cord hole opening/closing device substantially as hereinbefore described with reference to the drawings.

**Relevant Technical Fields**

- (i) UK Cl (Ed.M) A4L LACD, LAAJ, LSHC  
(ii) Int Cl (Ed.5) A47B 21/00

Search Examiner  
MR R STAGG

Date of completion of Search  
8 MARCH 1994

**Databases (see below)**

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1-12

- (ii) ONLINE DATABASES: EDOC

**Categories of documents**

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.  
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.  
A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	EP 0102582 A (W WAIBEL)	

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